CLAIMS

1. A method of encoding a set of data representing physical quantities, the encoding comprising forming (S5) a path between the samples of the set, the path passing a maximum of once via each sample location,

characterized in that it comprises, for two given successive sample locations (x_i, x_{i+1}) of the path, the step of:

- forming (S59, S63, S508, S510, S512) a vector (V_i) between the two sample locations, only taking into account the intermediate sample locations not already encoded by a vector.

2. A method according to claim 1, the set of data being bidimensional, characterized in that comprises the prior transformation (S50) of the set of data into a second set of monodimensional data.

3. A method according to claim 1, the set of data being bidimensional, characterized in that a vector is decomposed into two vectors (S507, S509, S511) and in that one of them is formed (S508, S510, S512) only taking into account the intermediate sample locations not already encoded by a vector.

4. A method according to any one of claims 1 to 3, characterized in that forming a vector between the two locations comprises:

- testing (S58, S62) all the intermediate locations between the two sample locations to determine whether they have already been encoded,

- reducing (S59, S63) the length of the vector as a function of the number of locations already encoded.

5. A method according to any one of claims 1 to 4, characterized in that the set of data is a block formed in an initial set of data.

6. A method according to any one of claims 1 to 5, characterized in that the set of data is the result of a DCT transformation (S1) of an initial set of data.

7. A method of decoding a set of data encoded by the method according to any one of claims 1 to 6, comprising a step (S22) of decoding a path, characterized in that the decoding of the path comprises the step of:

- deducing (S227, S231) the location (x_{i+1}) of a coefficient of the path as a function of the preceding location (x_i), the vector (V_i) between the two locations, and the locations already decoded.

8. A method of encoding digital samples of a set of data representing physical quantities, the encoding including the determination of an amplitude model and of a path between the samples of the set,

characterized in that it comprises the steps of:

- determining (S5a, S20a, S25a) a number of samples to encode,

- constructing (S3a, S21a) a list comprising the determined number of samples, classified by decreasing amplitude.

9. A method according to claim 8, characterized in that it comprises the steps of:

- determining (S3a) an initial list of samples,

- calculating (S5a) an encoding cost as a function of the list of samples,

- modifying (S8a) the list of samples,

the steps of calculating and modifying being reiterated to find a minimum encoding cost.

10. A method according to claim 9, characterized in that it further comprises the step (S10a) of encoding the set of data on the basis of the list of samples which provides the minimum encoding cost.

11. A method according to claim 9 or 10, characterized in that the initial list of samples comprises all the samples of the set of data.

12. A method according to any one of claims 9 to 11, characterized in that the modification (S9a) of the list of samples comprises the withdrawal of the sample of least amplitude.

13. A method according to any one of claims 9 to 12, characterized in that the encoding cost (S6a) comprises the rate of the encoded data.

14. A method according to any one of claims 9 to 13, characterized in that the encoding cost (S6a) comprises the distortion of the encoded data.

15. A method according to claim 8, comprising an initialization of an evolutionary algorithm according to which a population of lists of samples is determined, the population comprising a predetermined number of lists, characterized in that the determination of the population comprises the steps of:

- determining (S21a) a first list of samples classified by decreasing amplitude,
- modifying (S25a) the first list by withdrawal of a predetermined number of samples of lowest amplitude, to form a second list,

the steps of determining and modifying being reiterated by taking the second list of an iteration as the first list for the following iteration, provided that the predetermined number of lists has not been reached (S23a) and that the second list has a non-zero number of samples (S24a).

16. A method according to claim 15, characterized in that the population is completed (S26a) by lists picked randomly, if the second list formed has a zero number of samples before the predetermined number of lists has been reached.

17. A method according to any one of claims 8 to 16, characterized in that the set of data is a block of samples formed in a larger set of data.

18. A method according to any one of claims 8 to 17, characterized in that the data are a digital image.

19. A method of encoding a set of data representing physical quantities, the set of data comprising coefficients, the method comprising determining an amplitude model of the coefficients and a path between the coefficients,

characterized in that it comprises the prior step of:

- putting (S4b) the coefficients in order as a function of their respective locations in the set of data.

20. A method according to claim 19, characterized in that the prior step of putting the coefficients in order comprises putting them in order following a zig-zag path.

21. A method according to claim 20, characterized in that the ordered coefficients are arranged in a one-dimensional vector (V).

22. A method according to claim 19, characterized in that the prior step of putting the coefficients in order comprises forming blocks (S41b) of predetermined size in the set of data and putting the blocks formed in order (S42b) according to a predetermined order.

23. A method according to claim 22, characterized in that the ordered coefficients are arranged in a three-dimensional table (T).

24. A method according to any one of claims 19 to 23, characterized in that determining (S5b) the amplitude model comprises classifying the coefficients by decreasing amplitude.

25. A method according to any one of claims 19 to 24, characterized in that the set of data is the result of a discrete cosine transformation (S3b) of an initial set of data.

26. A method according to any one of claims 19 to 24, characterized in that the set of data is the result of a discrete wavelet transformation of an initial set of data.

27. A method of decoding a set of data representing physical quantities encoded by the method according to any one of claims 19 to 28, comprising the decoding of an amplitude model of the coefficients and of a path between the coefficients, so as to form a first set of decoded coefficients,

characterized in that it comprises the step of:

- putting the decoded coefficients in order (S24b) as a function of their respective locations in the first set of decoded coefficients so as to form a second decoded set.

28. A method of decoding according to claim 27, characterized in that the first set of decoded coefficients is a one-dimensional vector and in that the decoded coefficients are taken from first to last and are arranged in a two-dimensional table following a zig-zag path.

29. A method of decoding according to claim 27, characterized in that the first set of decoded coefficients is a three-dimensional table, and in that the decoded coefficients are arranged in a two two-dimensional table, the levels of the three-dimensional table being arranged in lexicographical order.

30. A device for encoding a set of data representing physical quantities, comprising means (22) for forming a path between the samples of the set, the path passing a maximum of once via each location,

characterized in that it comprises:

- means for forming a vector (V_i) between two given successive locations of the path, only taking into account the intermediate samples not already encoded by a vector.

31. A device according to claim 30, the set of data being bidimensional, characterized in that comprises means for the prior transformation of the set of data into a second set of monodimensional data.

32. A device according to claim 30, the set of data being bidimensional, characterized in that it is adapted to decompose a vector (V_i) into two vectors (X_i, Y_i) and in that one of them is formed only taking into account the intermediate samples not already encoded by a vector.

33. A device according to any one of claims 30 to 32, characterized in that the means for forming a vector between the two locations comprise:

- means for testing all the intermediate locations between the two sample locations to determine whether they have already been encoded,
- means for reducing the length of the vector as a function of the number of locations already encoded.

34. A device according to any one of claims 30 to 33, characterized in that it is adapted to process a set of data which is a block formed in an initial set of data.

35. A device according to any one of claims 30 to 34, characterized in that it is adapted to process a set of data which is the result of a DCT transformation of an initial set of data.

36. A device for decoding a set of data encoded by the device according to any one of claims 30 to 35, comprising means (42) for decoding a path, characterized in that it comprises:

- means for deducing the location of a coefficient of the path as a function of the preceding location, the vector between the two locations, and the locations already encoded.

37. An encoding device according to any one of claims 30 to 35, characterized in that the means for forming a vector are incorporated in:

- a microprocessor (100),

- a read only memory (102), comprising a program for processing the data, and

- a random access memory (103) comprising registers adapted to record variables modified during the execution of said program.

38. A decoding device according to claim 36, characterized in that the deducing means are incorporated in:

- a microprocessor (100),

- a read only memory (102), comprising a program for processing the data, and

- a random access memory (103) comprising registers adapted to record variables modified during the execution of said program.

39. A device for encoding digital samples of a set of data representing physical quantities, comprising means for determining an amplitude model and a path between the samples of the set,

characterized in that it comprises (2a):

- means (22a) for determining a number of samples to encode,

- means (23a) for constructing a list comprising the determined number of samples, classified by decreasing amplitude.

40. A device according to claim 39, characterized in that it comprises:

- means for determining an initial list (P) of samples,

- means for calculating an encoding cost (C) as a function of the list of samples,

- means for modifying the list of samples,

the operation of the means for calculating and modifying being reiterated to find a minimum encoding cost.

41. A device according to claim 40, characterized in that further comprises means for encoding the set of data on the basis of the list of samples which provides the minimum encoding cost.

42. A device according to claim 40 or 41, characterized in that the means for determining the initial list of samples are adapted to form it such that it comprises all the samples of the set of data.

43. A device according to any one of claims 40 to 42, characterized in that the means for modifying the list of samples are adapted to withdraw the sample of least amplitude.

44. A device according to any one of claims 40 to 43, characterized in that it is adapted to consider an encoding cost which comprises the rate of the encoded data.

45. A device according to any one of claims 40 to 44, characterized in that it is adapted to consider an encoding cost which comprises the distortion of the encoded data.

46. A device according to claim 39, comprising means for initializing an evolutionary algorithm according to which a population of lists of samples is determined, the population comprising a predetermined number of lists, characterized in that the means for determining the population comprises:

- means for determining a first list of samples classified by decreasing amplitude,

- means for modifying the first list by withdrawal of a predetermined number of samples of lowest amplitude, to form a second list,

the operation of the means for determining and modifying being reiterated by taking the second list of an iteration as the first list for the following iteration, provided that the predetermined number of lists has not been reached and that the second list has a non-zero number of samples.

47. A device according to claim 46, characterized in that it is adapted to complete the population by lists picked randomly, if the second list formed has a zero number of samples before the predetermined number of lists has been reached.

48. A device according to any one of claims 39 to 47, characterized in that it is adapted to encode a set of data which is a block of samples formed in a larger set of data.

49. A device according to any one of claims 39 to 48, characterized in that it is adapted to encode data which are a digital image.

50. An encoding device according to any one of claims 39 to 49, characterized in that the means for determining and construction are incorporated in:

- a microprocessor (100),
- a read only memory (102), comprising a program for processing the data, and
- a random access memory (103) comprising registers adapted to record variables modified during the execution of said program.

51. A device (2b) for encoding a set of data representing physical quantities, the set of data comprising coefficients, the device comprising means for determining an amplitude model of the coefficients and a path between the coefficients,

characterized in that it comprises:

- prior means for putting the coefficients in order as a function of their respective locations in the set of data.

52. A device according to claim 51, characterized in that the prior means for putting the coefficients in order are adapted to put them in order following a zig-zag path.

53. A device according to claim 52, characterized in that the prior means for putting the coefficients in order are adapted to arrange the ordered coefficients in a one-dimensional vector.

54. A device according to claim 51, characterized in that the prior means for putting the coefficients in order are adapted to form blocks of predetermined size in the set of data and to put in order the blocks formed according to a predetermined order.

55. A device according to claim 54, characterized in that the prior means for putting the coefficients in order are adapted to arrange the ordered coefficients in a three-dimensional table.

56. A device according to any one of claims 51 to 55, characterized in that the means for determining the amplitude model are adapted to classify the coefficients by decreasing amplitude.

57. A device according to any one of claims 51 to 56, characterized in that it is adapted to process a set of data which is the result of a discrete cosine transformation of an initial set of data.

58. A device according to any one of claims 51 to 56, characterized in that it is adapted to process a set of data which is the result of a discrete wavelet transformation of an initial set of data.

59. A device for decoding a set of data representing physical quantities encoded by the device according to any one of claims 51 to 58, comprising means for decoding an amplitude model of the coefficients and a path between the coefficients, so as to form a first set of decoded coefficients,

characterized in that it comprises:

- means for putting the decoded coefficients in order as a function of their respective locations in the first set of decoded coefficients so as to form a second decoded set.

60. A decoding device according to claim 59, characterized in that it is adapted to process a first set of decoded coefficients which is a one-dimensional vector and to take the decoded coefficients from first to last and to arrange them in a two-dimensional table following a zig-zag path.

61. A decoding device according to claim 59, characterized in that it is adapted to process a first set of decoded coefficients which is a three-dimensional table, and to arrange the decoded coefficients in a two two-dimensional table, the levels of the three-dimensional table being arranged in lexicographical order.

62. An encoding device according to any one of claims 51 to 58, characterized in that the prior means for putting in order are incorporated in:

- a microprocessor (100),

- a read only memory (102), comprising a program for processing the data, and

- a random access memory (103) comprising registers adapted to record variables modified during the execution of said program.

63. A decoding device according to any one of claims 59 to 61, characterized in that the means for putting in order are incorporated in:

- a microprocessor (100),

- a read only memory (102), comprising a program for processing the data, and

- a random access memory (103) comprising registers adapted to record variables modified during the execution of said program.

64. An apparatus (10) for processing a digital image, characterized in that it comprises means adapted to implement the method according to any one of claims 1 to 29.

65. An apparatus (10) for processing a digital image, characterized in that it comprises the device according to any one of claims 30 to 62.

66. A storage medium storing a program for implementing the method according to any one of Claims 1 to 29.

67. A storage medium according to claim 66, characterised in that said storage medium is detachably mountable on a device according to any one of Claims 30 to 62.

68. A storage medium according to claim 66 or 67, characterised in that said storage medium is a floppy disk or a CD-ROM.

69. A computer program on a storage medium and comprising computer executable instructions adapted to implement the method according to claim 1, when this program is loaded and executed in a computer system.